

NOTES:

If you have questions or don't understand something please ask me before the assignment is due. I do not bite and am always glad to help. If you don't communicate to me that you are struggling with the homework, then I assume you all understand it.

PAPER is cheap! So use more of it if you run out of room. Many of you were lost in your calculations because you didn't have enough room to work the problems out.

Remember your mathematical order of operations.

1. Inside parentheses
2. Exponents, left to right
3. Multiplication and division, left to right
4. Addition and subtraction, left to right

When finding your annuity or PV, keep your calculations in the calculator. In other words store answers instead of rounding them and re-entering them into the calculator. This will prevent large rounding errors and help you find a more accurate answer.

Use the powerpoint lecture. It is there for a reason, with all the formulas. Most of the questions could be answered by simply looking at the formulas or following steps on the powerpoint lecture.

Check your work with excel. If you don't think you're getting the right answer, use excel to check your work. Also, use simple logic to figure out if your answer makes sense.

Amortize means, amortize the loan, or show me how the loan is being amortized. In other words, show me the repayment schedule.

Many of you overlooked directions on the homework. Read carefully.

Periodic compounding. The interest rate is always a yearly rate, but if compounding happens more than one time a year, the interest rate must be spread evenly over the compounding periods. This is also true for the APR financing rate.

Homework is only 10% of your grade, so learn from them and then rock it on the test!

Average = 44/65

PS. Most everybody forgot to spread the interest rate over monthly payments in question 5. Therefore, I did not mark wrong.

| | | |
|----|--------------------------|---------------------|
| #1 | 50,000 * .15 = | 7500 |
| | 25,000 * .25 = | 6250 |
| | 25,000 * .34 = | 8500 |
| | 235,000 * .39 = | 91650 |
| | 1,899,000 * .34 = | 645660 |
| | Total Federal Income Tax | \$759,560.00 |

| | | | |
|----|------------------|-----------------------------|---------------------|
| #2 | $V_0 = 50000$ | $V_n = V_0(1+i)^n$ | |
| | $i = .06$ | $V_n = 50000 (1.06)^{18} =$ | \$142,716.96 |
| | $n = 33-15 = 18$ | | |

| #3 | Payment | Total pay | Interest | Principal Paid | Principal balance | 0.08 |
|----|-----------------|-----------|--|-------------------|-------------------|------|
| | 0 | | | | 550000 | |
| | 1 | 105639.82 | 44000 | 61639.82 | 488360.18 | |
| | 2 | 105639.82 | 39068.81 | 66571.01 | 421789.17 | |
| | 3 | 105639.82 | 33743.13 | 71896.69 | 349892.49 | |
| | 4 | 105639.82 | 27991.40 | 77648.42 | 272244.07 | |
| | 5 | 105639.82 | 21779.53 | 83860.29 | 188383.77 | |
| | 6 | 105639.82 | 15070.70 | 90569.12 | 97814.65 | |
| | 7 | 105639.82 | 7825.17 | 97814.65 | 0.01 | |
| | $V_0 = 550,000$ | | $A = V_0 / [1-(1+i)^{-n} / i]$ | | | |
| | $i = .08$ | | | | | |
| | $n = 7$ | | $A = 550000 / [1-(1.08)^{-7} / .08] =$ | 105,639.82 | | |

| #4 | Payment | Total pay | Interest | Principal Paid | Principal balance | 0.065 |
|----|-----------------|-----------|---|------------------|-------------------|-------|
| | 0 | | | | 340000 | |
| | 1 | 65324.24 | 22100 | 43224.24 | 296775.76 | |
| | 2 | 65324.24 | 19290.42 | 46033.82 | 250741.94 | |
| | 3 | 65324.24 | 16298.23 | 49026.01 | 201715.93 | |
| | 4 | 65324.24 | 13111.54 | 52212.70 | 149503.23 | |
| | 5 | 65324.24 | 9717.71 | 55606.53 | 93896.70 | |
| | 6 | 100000 | 6103.29 | 93896.71 | -0.02 | |
| | $V_0 = 340,000$ | | $A = [V_0 - B / (1+i)^{n+1}] / [1-(1+i)^{-N} / i]$ | | | |
| | $B = 100,000$ | | $A = [340000 - 100000 / (1.065)^{5+1}] / [1-(1.065)^{-5} / .065]$ | | | |
| | $i = .065$ | | | | | |
| | $n = 5$ | | $A = 271466.59 / 4.156 =$ | 65,324.24 | | |

| #5 Payment | Total pay | Interest | Principal Paid | Principal balance | 0.0033333 |
|------------|-----------|----------|----------------|-------------------|-----------|
| 0 | | | | 75000 | |
| 1 | 1812.5 | 250 | 1562.5 | 73437.5 | |
| 2 | 1807.29 | 244.79 | 1562.5 | 71875.00 | |
| 3 | 1802.08 | 239.58 | 1562.5 | 70312.50 | |
| 4 | 1796.88 | 234.38 | 1562.5 | 68750.00 | |
| 5 | 1791.67 | 229.17 | 1562.5 | 67187.50 | |
| 6 | 1786.46 | 223.96 | 1562.5 | 65625.00 | |
| 7 | 1781.25 | 218.75 | 1562.5 | 64062.50 | |
| 8 | 1776.04 | 213.54 | 1562.5 | 62500.00 | |
| 9 | 1770.83 | 208.33 | 1562.5 | 60937.50 | |
| 10 | 1765.63 | 203.13 | 1562.5 | 59375.00 | |
| 11 | 1760.42 | 197.92 | 1562.5 | 57812.50 | |
| 12 | 1755.21 | 192.71 | 1562.5 | 56250.00 | |
| 13 | 1750.00 | 187.50 | 1562.5 | 54687.50 | |
| 14 | 1744.79 | 182.29 | 1562.5 | 53125.00 | |
| 15 | 1739.58 | 177.08 | 1562.5 | 51562.50 | |
| 16 | 1734.38 | 171.88 | 1562.5 | 50000.00 | |
| 17 | 1729.17 | 166.67 | 1562.5 | 48437.50 | |
| 18 | 1723.96 | 161.46 | 1562.5 | 46875.00 | |
| 19 | 1718.75 | 156.25 | 1562.5 | 45312.50 | |
| 20 | 1713.54 | 151.04 | 1562.5 | 43750.00 | |
| 21 | 1708.33 | 145.83 | 1562.5 | 42187.50 | |
| 22 | 1703.13 | 140.63 | 1562.5 | 40625.00 | |
| 23 | 1697.92 | 135.42 | 1562.5 | 39062.50 | |
| 24 | 1692.71 | 130.21 | 1562.5 | 37500.00 | |
| 25 | 1687.50 | 125.00 | 1562.5 | 35937.50 | |
| 26 | 1682.29 | 119.79 | 1562.5 | 34375.00 | |
| 27 | 1677.08 | 114.58 | 1562.5 | 32812.50 | |
| 28 | 1671.88 | 109.38 | 1562.5 | 31250.00 | |
| 29 | 1666.67 | 104.17 | 1562.5 | 29687.50 | |
| 30 | 1661.46 | 98.96 | 1562.5 | 28125.00 | |
| 31 | 1656.25 | 93.75 | 1562.5 | 26562.50 | |
| 32 | 1651.04 | 88.54 | 1562.5 | 25000.00 | |
| 33 | 1645.83 | 83.33 | 1562.5 | 23437.50 | |
| 34 | 1640.63 | 78.13 | 1562.5 | 21875.00 | |
| 35 | 1635.42 | 72.92 | 1562.5 | 20312.50 | |
| 36 | 1630.21 | 67.71 | 1562.5 | 18750.00 | |
| 37 | 1625.00 | 62.50 | 1562.5 | 17187.50 | |
| 38 | 1619.79 | 57.29 | 1562.5 | 15625.00 | |
| 39 | 1614.58 | 52.08 | 1562.5 | 14062.50 | |
| 40 | 1609.38 | 46.88 | 1562.5 | 12500.00 | |
| 41 | 1604.17 | 41.67 | 1562.5 | 10937.50 | |
| 42 | 1598.96 | 36.46 | 1562.5 | 9375.00 | |
| 43 | 1593.75 | 31.25 | 1562.5 | 7812.50 | |
| 44 | 1588.54 | 26.04 | 1562.5 | 6250.00 | |
| 45 | 1583.33 | 20.83 | 1562.5 | 4687.50 | |

| | | | | |
|----|---------|-------|--------|---------|
| 46 | 1578.13 | 15.63 | 1562.5 | 3125.00 |
| 47 | 1572.92 | 10.42 | 1562.5 | 1562.50 |
| 48 | 1567.71 | 5.21 | 1562.5 | 0.00 |

$V_0 = 75,000$

$i = .04/12$

$n = 4$

$m = 12$

Equal principal

$75000/48 = \$1562.50$

#6

Step 1 $A = V_0 / [1 - (1+i)^{-n} / i]$

$$A = 590000 / [1 - (1 + (.09/2))^{-60} / (.09/2)] = 28588.01$$

$V_0 = 590,000$

$i = .09/2$

Step 2 Payments remaining after last payment $60 - 29 = 31$

$n = 30$

$$V_0 = A [1 - (1 + i)^{-n} / i]$$

$m = 2$

$$V_0 = 28588.01 [1 - (1 + (.09/2))^{-31} / (.09/2)] = 472971.21$$

Step 3 Add 1 period of interest

$$472971.21 * .045 = 21283.7$$

Balloon payment = **\$494,254.91**

How much of 20th payment is interest and how much is principal?

$$V_{019} = A [1 - (1 + i)^{-n} / i]$$

Payments remaining = $60 - 19 = 41$

$$V_{019} = 28588.01 [1 - (1 + (.09/2))^{-41} / (.09/2)] = \mathbf{\$530,768.12}$$

(principal balance period 19)

$$\text{Interest period 20} = 530768.12 * (.09/2) = \mathbf{\$23,884.57}$$

$$\text{Principal payment} = 28588.01 - 23884.57 = \mathbf{\$4,703.44}$$

#7

X

$$A = Vo / [1 - (1 + APR)^{-n} / i]$$

$$A = 90000 / [1 - (1 + (.1/12))^{-60} / (.1/12)] = 1912.23$$

$$Vo = A [1 - (1 + i)^{-n} / i]$$

$$Vo = 1912.23 [1 - (1 + (.09/12))^{-60} / (.09/12)] = \mathbf{\$92,118.57}$$

$$Vo = 90,000$$

$$i = .09/12$$

$$APR = .1/12$$

$$n = 5$$

$$m = 12$$

Y

$$A = Vo / [1 - (1 + APR)^{-n} / i]$$

$$A = 94000 / [1 - (1 + (.06/12))^{-48} / (.06/12)] = 2207.59$$

$$Vo = A [1 - (1 + i)^{-n} / i]$$

$$Vo = 2207.59 [1 - (1 + (.09/12))^{-48} / (.09/12)] = \mathbf{\$88,711.52}$$

$$Vo = 94,000$$

$$i = .09/12$$

$$APR = .06/12$$

$$n = 4$$

$$m = 12$$

Z

$$A = Vo / [1 - (1 + APR)^{-n} / i]$$

$$A = 97000 / 24 = 4041.67$$

$$Vo = A [1 - (1 + i)^{-n} / i]$$

$$Vo = 4041.67 [1 - (1 + (.09/12))^{-24} / (.09/12)] = \mathbf{\$88,468.71}$$

$$Vo = 97,000$$

$$i = .09/12$$

$$APR = 0$$

$$n = 2$$

$$m = 12$$

Option Z gives the lowest cost

#8

$$\text{New Price in 2011} = 60000 * (1.035)^{11} = 87598.18$$

$$\text{Salvage value} = 15000$$

$$\text{Replacement cost} = \mathbf{\$72,598.18}$$